

## ***United States of America***

### ***DRAFT PROPOSAL FOR THE WORK OF THE CONFERENCE***

**WRC-07 Agenda Item 1.9:** to review the technical, operational and regulatory provisions applicable to the use of the band 2 500-2 690 MHz by space services in order to facilitate sharing with current and future terrestrial services without placing undue constraint on the services to which the band is allocated;

**Background Information:** The band 2500-2690 MHz is allocated to both terrestrial and satellite services on a primary basis. The terrestrial services include the Mobile Services and the Fixed Services (including IMT-2000). Both the terrestrial Mobile and Fixed Services have been rapidly evolving to encompass high-speed mobile Internet services requiring sensitive receiving equipment, which are highly susceptible to interference.

The 2500-2690 MHz band is also allocated to the satellite services, which include MSS (including GSO and non-GSO), BSS (including GSO and non-GSO), and FSS. In WRC-03 the issue of sharing between terrestrial services and NGSO BSS (Sound) in certain Region 3 countries was resolved with the revision of pfd limits/coordination thresholds for NGSO BSS (Sound) per Resolution 539. GSO BSS (Sound) limits/coordination thresholds within these countries were also tightened for systems for which complete Appendix 4 coordination information has been received after 1 June 2005. Other than for these Region 3 countries the pfd limits for BSS remained the same as given in Table 21-4.

In general, co-frequency sharing between the mobile-satellite service (MSS) and terrestrial services has been found to be difficult in the ITU-R studies. The sharing between the terrestrial services and the MSS poses risks of harmful interference to both systems. In addition, it will require large separation distance between terrestrial stations and MSS earth stations in order to avoid harmful interference to both stations. ITU-R Report M.2041 studied the feasibility of sharing between MSS and MS for IMT-2000 and highlighted the incompatibility between these two services on a co-frequency basis.

Both BSS and FSS are also allocated to the 2500-2690 MHz band and are subject to the limits in Table 21-4. WRC-03 recognized the potential sharing difficulty between the terrestrial and satellite services and caused the formation of Joint Task Group 6-8-9 to study the issues related to sharing.

JTG 6-8-9 has developed a methodology for estimating the satellite pfd values required to protect terrestrial services. Based on this methodology the USA has determined that pfd values at the surface of the Earth produced by the emissions of MSS, BSS and FSS satellites of -136 dBW/m<sup>2</sup>/MHz for angles of arrival below 5<sup>0</sup> and -122 dBW/m<sup>2</sup>/MHz for angles of arrival greater than 25<sup>0</sup> would yield tolerable levels of interference to the Fixed and non IMT-2000 mobile services.

There are definite advantages to having a hard limit regulatory regime, based on the specification of a power flux density mask in Article 21 of the Radio Regulations. First it would ensure the long term safeguard of terrestrial systems in the band 2 500-2 690 MHz from satellite interference and could also be beneficial to the long-term development of space services as a defined set of pfd limits would be known. Additionally, a hard limit regime would result in no need for coordination between administrations with terrestrial services and administrations planning to deploy FSS, MSS or BSS systems.

However, there may be potential disadvantages to the hard limit regime based on the PFD limits that are ultimately adopted by the WRC for both the terrestrial and space services. The PFD limits adopted to protect terrestrial networks may have the result that it would be difficult to operate satellite networks in this frequency band. Alternatively, the PFD limits adopted may have the result that it would be difficult to operate terrestrial networks in this frequency band.

This proposal calls for assigning the above pfd values for MSS, FSS and BSS in Article 21, Table 21-4, in order to provide long term protection of terrestrial services in this band.

**Proposal**

USA/ /1 MOD

TABLE 21-4 (WRC-03)

Frequency band	Service*	Limit in dB(W/m <sup>2</sup> ) for angles of arrival ( $\delta$ ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
2 500-2 690 MHz	Fixed-satellite	<del>-152</del> <sup>9</sup>	<del>-152 + 0.75(<math>\delta</math> - 5)</del> <sup>9</sup>	<del>-137</del> <sup>9</sup>	4 kHz
2 520-2 670 MHz	Broadcasting-satellite	<del>-136</del>	<del>-136 + 0.7(<math>\delta</math> - 5)</del>	<del>-122</del>	1 MHz
2 500-2 516.5 MHz (No. 5.404) <u>2500-2535</u>	Radiodetermination-satellite <u>Mobile Satellite</u> <u>(Space to Earth)</u>				
3 400-4 200 MHz	Fixed-satellite (space-to-Earth) (geostationary-satellite orbit)	-152	-152 + 0.5( $\delta$ - 5)	-142	4 kHz

**Reasons:** Power flux density limits would facilitate FSS, BSS and MSS sharing with current and future terrestrial services in the 2500-2690 MHz band as appropriate pfd limits would provide for long term safeguard of terrestrial (e.g., FS and MS) systems in the band 2 500-2 690 MHz and would also provide certainty to the space services as a defined set of pfd limits would be known and extensive coordination with unknown outcomes would not be needed. Studies have shown that a satellite pfd value of -136 dBW/m<sup>2</sup>/MHz at angles below 5<sup>0</sup>, and -122 dBW/m<sup>2</sup>/MHz at angles greater than 25<sup>0</sup> yielded acceptable levels of interference to terrestrial services in the 2500-2690 MHz band.

USA/ /2 MOD

**APPENDIX 5 (Rev. WRC-03)  
ANNEX 1**

TABLE 5-2 (WRC-03)

Frequency band (MHz)	Terrestrial service to be protected	Coordination threshold values				
		GSO space stations		Non-GSO space stations		
		pfd (per space station) calculation factors (NOTE 2)		pfd (per space station) calculation factors (NOTE 2)		% FDP (in 1 MHz) (NOTE 1)
		$P$	$r$ dB/degrees	$P$	$r$ dB/degrees	
2 500-2 520	Analogue FS telephony (NOTE 5)	-146 dB(W/m <sup>2</sup> ) in 4 kHz and -128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	-146 dB(W/m <sup>2</sup> ) in 4 kHz and -128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	
	All other cases	-128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	-128 dB (W/m <sup>2</sup> ) in 1 MHz	0.5	25
2 520-2 535	Analogue FS telephony (NOTE 5)	-154 dB(W/m <sup>2</sup> ) in 4 kHz and -136 dB(W/m <sup>2</sup> ) in 1 MHz	0.75	-146 dB(W/m <sup>2</sup> ) in 4 kHz and -128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	
	All other cases	-136 dB(W/m <sup>2</sup> ) in 1 MHz	0.75	-128 dB(W/m <sup>2</sup> ) in 1 MHz	0.5	25

**Reasons:** Consequential to adding pfd limit for MSS to Article 21, Table 21-4 per USA/ /1. Limits on MSS pfd eliminate the need for coordination with terrestrial systems in the band 2 500-2 535 MHz.